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Indian Standard

GENERAL PURPOSE FLAT PALLETS FOR THROUGH TRANSIT OF GOODS — PERFORMANCE REQUIREMENTS

UDC 621·869·821·620·16

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

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Price Group 2

Pallets Sectional Committee, HMD 11

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Pallets Sectional Committee had been approved by the Heavy Mechanical Engineering Division Council.

In the formulation of this standard, assistance has been derived from draft Technical Report ISO/TR 10233 : 1989 'General purpose flat pallets for through transit of goods — Performance requirements', issued by the International Organization for Standardization (ISO).

In reporting the results of an analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'.

Indian Standard

GENERAL PURPOSE FLAT PALLETS FOR THROUGH TRANSIT OF GOODS — PERFORMANCE REQUIREMENTS

1 SCOPE

1.1 This standard establishes recommended levels of performance for pallets when tested by the methods given in IS 6219 : 1989. It is applicable to general purpose flat pallets intended for through transit of goods.

1.2 The performance requirements given in the standard relate to the following two grades of pallets:

a) Grade 'N' is a minimum requirement suitable for a large number of pallets in through transit.

b) Grade 'S' is a minimum requirement for several types of pallets which are mainly used in some part of the world in through transit, for example, two-way pallets and partial four-way pallets.

1.3 A tabular summary of the recommended performance levels in relation to the methods of test of IS 6219 : 1989 is given in Annex A.

2 REFERENCES

2.1 The following Indian Standards are necessary adjuncts to this standard:

IS No.	*Title*
3971 : 1976	Glossary of terms on pallets (*first revision*)
6219 : 1989	Test code for non-expendable flat pallets (*second revision*)
7276 : 1989	Specification for non-expendable pallets (*first revision*)

3 TERMINOLOGY

3.1 For the purpose of this standard, the terms and definitions given in IS 3971 : 1976 shall apply.

4 NUMBER OF PALLETS TESTED

4.1 When evaluating a pallet in relation to its designed load capacity, a minimum of three replicates shall be tested and the complete sequence of seven tests shall be carried out consecutively in the order laid down in IS 6219 : 1989.

4.2 The average of the three or more results shall be the criterion for assessment. For acceptance of a pallet design, a seven tests shall meet the requirements of this Indian Standard.

4.3 Complete or partial fracture of any pallet during performance test in relation to IS 6219 : 1989 shall be considered failure to meet the requirements of this Indian Standard. This shall apply however large the sample undergoing test.

5 PERFORMANCE REQUIREMENTS

5.1 x and y are used to identify displacement/deflection/deformation measurements in the horizontal and vertical plane respectively, but the actual detail and magnitude varies between tests.

5.2 All requirements for maximum/minimum deflections related timber pallets at 20 percent moisture content by weight.

6 NORMAL GRADE PALLETS (GRADE 'N')

When pallets are tested in accordance with the methods described in IS 6219 : 1989, the following shall be the recommended performance levels.

6.1 Static Tests

6.1.1 *Stacking Test*

The change in deformation y shall not exceed 4 mm under full load measured at the 0·25 R datum load point. During unloading, the change in y shall not exceed 1·5 mm at the 0·25 R datum load point, recovery shall be attained within 1 hour.

6.1.2 *Bending Test*

The deflection shall not exceed 8 mm under load measured after the 0·10 R datum load point. Recovery shall be attained within 1 hour to a value not exceeding 1 mm measured at the 0·10 R datum load point.

The distance between the decks height shall be a minimum of 95 m under full test load (related to IS 7276 : 1989).

6.1.3 *Bottom Deck Test*

The deflection shall not exceed 7 mm under load measured after the 0·10 R datum point. Recovery shall be attained within 1 hour to a value not exceeding 0·7 mm measured at the 0·10 R datum load point.

6.2 Impact Tests

6.2.1 *Inclined Plane — Shear Test*

After 3 impacts the increase of x at any point on the leading edges shall be 6 mm maximum. The mean increase of y shall be 4 mm maximum.

6.2.2 *Inclined Plane — Top Deck Edge Impact Test*

After 3 impacts the mean increase each of x and y shall be 3 mm maximum.

6.2.3 *Inclined Plane — Block Impact Test*

After 3 impacts the mean each of x (combined measurement of block displacement plus indentation depth), y and z shall be 3 mm maximum.

There is no displacement requirement for circular blocks in relation to x.

6.2.4 *Corner Drop Test*

After 3 drops on the same corner of the same pallet, the change in diagonal y shall be a maximum of 0·04 y measured as the mean change for 3 pallets.

7 SPECIAL GRADE PALLETS (GRADE 'S')

When pallets are tested in accordance with the methods described in IS 6219 : 1989, the following are the recommended performance levels.

7.1 Static Tests

7.1.1 *Stacking Test*

The change in deformation y shall not exceed 1 mm under full load measured after the 0·25 R datum point. During unloading the change in y shall not exceed 0·5 mm at the 0·25 R datum load point recovery shall be attained within 1 hour.

7.1.2 *Bending Test*

The rate of deflection shall decrease during the test and, in addition, the deflection shall not exceed 3 mm under load measured after the 0·10 R datum point. Recovery shall be attained within 1 hour to a value not exceeding 0·5 mm measured at the 0·10 R datum load point.

The distance between the decks height shall be a minimum of 95 mm under full test load as per IS 7276 : 1989.

7.1.3 *Bottom Deck Test*

The rate of deflection shall decrease during the test and, in addition, the deflection shall not exceed 2 mm under load measured after the 0·10 R datum point. Recovery shall be attained within 1 hour to a value not exceeding 0·4 mm measured at the 0·10 R datum load point.

7.2 Impact Tests

7.2.1 *Inclined Plane — Shear Test*

After 3 impacts the increase of x at any point on the leading edges shall be 4 mm maximum. The mean increase of y shall be 2 mm maximum.

7.2.2 *Inclined Plane — Top Deck Edge Impact Test*

After 3 impacts the mean increase each of x and y shall be 2 mm maximum.

7.2.3 *Inclined Plane — Block Impact Test*

After 3 impacts the mean each of x (combined measurement of block or stringer displacement plus indentation depth), y and z shall be 3 mm maximum.

There is no displacement requirement for circular blocks in relation to x.

7.2.4 *Corner Drop Test*

After 3 drops on the same corner of the same pallet, the change in diagonal y shall be a maximum of 0·04 y measured as the mean change for 3 pallets.

NOTE — With nailed wooden pallets, the results from the Corner Drop Test (**6.2.4** and **7.2.4**) are often sensitive to moisture changes (shrinkage and expansion) and consequent tightness of joints. When assessing Corner Drop Test results, particular emphasis shall be placed upon records of moisture content both on assembly and during test and ensuring that these are representative of normal manufacture and service. In this test, although damage that renders a pallet unsuitable for its purpose is not acceptable, minor compression damage within 50 mm of the impacted corner is acceptable.

ANNEX A

(*Clause* 1.3)

SUMMARY OF RECOMMENDED PERFORMANCE REQUIREMENTS

Tests		Maximum Test Load	Fall	No. of Repititions	Maximum Permitted Deflection		Permitted Damage
					'N'	'S'	
(1)		(2)	(3)	(4)	(5)	(6)	(7)
Static	Stacking	1·10 R	—	1	4 mm	1 mm	Zero
	Bending	1·25 R	—	1	8 mm	3 mm	Zero
	Bottom deck	1·15 R	—	1	7 mm	2 mm	Zero
Impact	Inclined plane shear	0·075 R	1 m	3	x y 6 mm, 4 mm	x y 4 mm, 2 mm	Zero
	Inclined plane top	0·075 R	1 m	3	x y 3 mm, 3 mm	x y 2 mm, 2 mm	Zero
	Inclined plane block	0·075 R	750 mm	3	x, y, 3 mm, 3 mm z 3 mm	x, y, 3 mm 3 mm z 3 mm	block indentation
	Corner drop	self weight	1 m 500 mm	3	0·04 y	0·04 y	local compression

NOTE — This table is a guide only, for more detailed information reference should be made to the text.

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